Editorial

Who benefits from postoperative ICU admissions?—more research is needed

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Postoperative complications increase mortality and reduce quality of life after surgery (1). Recently, numbers of elderly patients with severe comorbidity who are in need of a surgical service have increased, as well as the numbers of patients who are at risk of postoperative complications (2). Thus, health care systems should strive to reduce postoperative complications and mortality by improving postoperative care after elective surgery (1,3).

Postoperative admission to the intensive care unit (ICU) is commonly regarded as an important component to a safe and effective pathway for prevention, early recognition and timely management of life-threatening complications occurring in the immediate postop period (1). However, it is unclear whether the routine use of intensive care services can improve postoperative care, or the outcomes for high risk surgical patients (4). Since intensive care is very expensive and the resources are frequently limited, some authors regard routine admission of high risk patients after surgery as an inadequate allocation of limited medical resource (5,6).

Recently published manuscript by Kahan *et al.* (7) tried to look into this issue. The manuscript reported the findings of their pre-planned analysis of the International Surgical Outcomes Study (ISOS) cohort. ISOS was a large prospective multinational study involving more than 44,000 patients undergoing elective surgery from 474 hospitals of 27 countries. Kahan *et al.* sought to study the association between immediate admission to critical care services after elective surgery and in-hospital mortality. They also investigated whether this association was different between high *vs.* low and middle income countries and the potential effects of critical care at the patient level and hospital level adjusting for potential confounding factors.

Interestingly, there was no evidence of survival benefit from admission to critical care services immediately following surgery (7). In fact, patients who were transferred to the ICU form operating theater for immediate postoperative care had a higher mortality rate than patients admitted to a standard ward even after adjustment for potential confounding factors. There was also no association between hospital characteristics and hospital mortality. This was true for high income countries and low and middle income countries as well.

This study has several strengths. It collected data prospectively for 7 days from 474 hospitals in 27 countries, making it one of the largest studies in this patient population. Also, the authors were able to collect detailed data on baseline risk factors that were objective, and were routinely collected for clinical reasons. Thus, the study had sufficient data to construct relevant risk adjustment model. Finally, through analysis of a large data set it was possible to compare outcomes for similar patients who were cared for differently as a part of their routine treatment; in a so-called a 'natural trial'. This approach can be very powerful

in health service research.

Nevertheless, the results of this study are challenging to interpret. Although natural trials can be very powerful, if baseline data is insufficient to assess each patients' risks, then residual confounding could still affect results of the study (8). Second, this study did not report the exact reason for ICU admissions. Some patients may have been admitted to the ICU, not as routine observatory purposes but for intensive organ support necessitated by unexpected events during the operation. This uncertainty in the data could have a significant effect on the analysis. Third, the organizational characteristics of ICU were not taken into account in their analysis. It is well known that organizational characteristics such as availability of intensivist, and nurse-to-patient ratio can have profound impact on patient outcomes (9).

It is clear that routine admission to ICU after surgery is not helpful for majority of patients undergoing elective operations. But it doesn't mean all ICU admissions are futile. Future research should focus on identifying subpopulation of patients who would likely to benefit from intensive care in the immediate postoperative period.

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Footnote

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